

What is claimed is:

1. An apparatus comprising:  
a baseband module adapted to filter a modulated signal by programming an  
impulse response of a filter to a programmable convolver.
2. The apparatus of claim 1, wherein the baseband module further comprises:  
a memory to store the impulse response of the filter; and  
a digital to analog converter (DAC) to provide a time phase of a stored  
impulse response of the filter to the programmable convolver.
3. The apparatus of claim 2, wherein the baseband module further comprises:  
an automatic gain control to control an output signal level of the  
programmable convolver.
4. The apparatus of claim 3, wherein the baseband module further comprises:  
a filter operably coupled to an input of the programmable convolver to filter  
the modulated signal, wherein an impulse response of the filter is programmed  
according to modulated signal characteristics.
5. The apparatus of claim 4, wherein a resolution of the DAC and a sampling rate  
of the DAC are set according to the modulated signal characteristics.
6. The apparatus of claim 4, wherein a length of the impulse response is set  
according to the modulated signal characteristics.
7. The apparatus of claim 2, further comprising a second DAC.

8. The apparatus of claim 2, wherein the memory comprises an impulse response of a first filter and an impulse response of a second filter, and the programmable convolver is programmed with one of the impulse response of the first filter and the impulse response of the second filter according to the modulated signal characteristics.

9. The apparatus of claim 4, wherein the programmable convolver is a complex programmable convolver.

10. The apparatus of claim 4, wherein the filter is a programmable convolver having an analog output.

11. An apparatus comprising:

a multi-mode receiver to receive signals of two communication systems, wherein the receiver is adapted to switch between modes by programming a baseband module according to characteristics of a received signal; and

a memory to store a first impulse response and a second impulse response to program a filter of the baseband module.

12. The apparatus of claim 11, wherein the baseband module comprises:

an in-phase (I) channel to filter an I signal of a modulated signal and a quadrature (Q) channel to filter a Q signal of the modulated signal.

13. The apparatus of claim 12, wherein the I channel comprises:

a first filter having a programmable frequency response, operably coupled to an input of a buffer; and

a second filter having a programmable frequency response, operably coupled to an output of the buffer and to an input of a programmable convolver.

14. The apparatus of claim 13, wherein the I channel further comprises:

digital to analog converters (DACs) operably coupled to the programmable convolver, wherein the DACs comprise an adjustable sampling rate and an adjustable

resolution.

15. The apparatus of claim 14, wherein the I channel further comprises:

an automatic gain control operably coupled to the programmable convolver to  
5 control a signal level of the programmable convolver and to provide an average  
amplitude level at the programmable convolver output.

16. The apparatus of claim 12, wherein the Q channel comprises:

a first filter having a programmable frequency response, operably coupled to  
10 an input of a buffer; and

a second filter having a programmable frequency response, operably coupled  
to an output of the buffer and to an input of a programmable convolver.

17. The apparatus of claim 16, wherein the Q channel further comprises:

digital to analog converters (DACs) operably coupled to the programmable  
convolver, wherein the DACs comprise an adjustable sampling rate and an adjustable  
resolution.

18. The apparatus of claim 17, wherein the Q channel comprises:

an automatic gain control operably coupled to the programmable convolver to  
control a signal level of the programmable convolver and to provide an average  
amplitude level at the programmable convolver output.

19. The apparatus of claim 12, wherein the multi-mode receiver is a direct  
25 conversation multi-mode receiver.

20. The apparatus of claim 12, wherein the I channel and the Q channel comprise  
programmable complex convolvers.

21. The apparatus of claim 13, wherein the first filter and the second filter are  
programmable convolvers.

22. The apparatus of claim 16, wherein the first filter and the second filter are programmable convolvers.

5 23. A method of selecting a mode of a multi-mode receiver comprising:  
programming a programmable convolver with an impulse response of a filter.

24. The method of claim 23, further comprising:  
setting a frequency response of a filter by modifying the structure of the filter  
10 and setting the number of poles of the filter.

25. The method of claim 24, further comprising:  
setting a sampling rate and a resolution to a digital to analog converter to  
switch between receiving modes of the multi-mode receiver.

15 26. The method of claim 25, further comprising:  
setting a length of the impulse response according to a received signal  
characteristic.

20 27. The method of claim 26, further comprising:  
providing a combined analog and digital gain control to control a signal level  
of the programmable convolver.